

REMARKS

These remarks are responsive to the Office Action dated November 18, 2003.

Claims 1-28 are pending in the present application. Claims 1-28 have been rejected.

Claims 1-28 remain pending.

The present invention as recited in varying scope in all of the independent claims is directed toward a method for allowing the sharing of code between separate protocol layers and a method and structure for eliminating the need for the copying of data between protocol layers. The method is accomplished by the creation of a generic protocol layer class (GPLC) having the two key methods "send" and "receive" and a common data buffer in which the sent or received data is placed and acted upon by each protocol layer implemented with the GPLC. Instead of copying the data packet passed to it by a higher or lower protocol layer implemented with the GPLC, a protocol layer implemented with the GPLC acts upon the common data buffer by moving a "start" pointer and an "end" pointer along the data contained in the common data buffer prior to invoking the next higher or lower protocol layer implemented with the GPLC.

Claim 1

Claim 1 is provided below for ease of review.

1. In a network having a plurality of computer systems each including a processor, a memory and a network adapter, the memory containing a data structure used for storing a common data buffer, a method for the sending and receiving of application program data by layers or sub-layers of at least one communications protocol without recopying of the application program data, comprising:
 - under control of a sending computer system,
 - storing in a plurality of pointers to locations within the common data buffer, a start and an end location of a next slice of data being sent;
 - adding an appropriate header to the slice of data being sent by placing the header in the common data buffer immediately preceding the location within the common data buffer pointed to by the start pointer and adjusting the start pointer to point to a memory location within the common data buffer of a first byte of the header added to the data contained in the common data buffer; and

invoking a send procedure of a next lower protocol layer and transferring by an address reference the slice of data to be sent by the next lower protocol layer; and
 under control of a receiving computer system,
 invoking a receive method of a next lower protocol layer;
 processing and removing any header added to a received slice of data
 from the send procedure of the same protocol layer level on the sending computer system
 by adjusting a start pointer initially pointing to a memory location within the common
 data buffer of a first byte of the header to point to a first memory location within the
 common data buffer following the header; and
 exiting and returning by an address reference to a receive procedure of
 a next higher protocol layer the received slice of data.

35 USC §103 Rejections

The Examiner has stated:

Claims 1-28 are rejected under 35 USC 103(a) as being
 unpatentable over Boucher et al. (US 6226680 B1) in view of Isfeld et al.
 (5828835 A).

As per claims 1, 2, 6, 10, 11, 15, 19, 20, 24, and 28, Boucher teaches
 about a network having a plurality of computer systems each including a
 processor, a memory (see col. 5, lines 9-11), and network adapter (see col.5,
 line 2), ... Boucher does not explicitly teach of storing in a plurality of
 pointers to locations within the common data buffer, a start and an end
 location of a next slice of data being send; adjusting the start pointer to a
 point to a memory location within the common data buffer...; and
 adjusting a start pointer to point to a first memory location.... Isfeld
 teaches of storing...; adjusting the start pointer to point to point to a
 memory location...; and adjusting the start pointer to point to a first
 memory location.... It would have been obvious to a person of ordinary
 skill in the art at the time the invention was made to employ the teachings
 of Isfeld with the system of Boucher....without such pointers and their
 ability to be adjusted, the application program data would be missing some
 data or contain errors.

Applicant respectfully traverses the Examiner's rejections.

Boucher discloses a system for protocol processing in a computer network and
 includes an intelligent network interface card (INIC) or communication processing device
 (CPD) associated with a host computer. The INIC provides a fast-path that avoids
 protocol processing for most large multipacket messages, greatly accelerating data
 communication. The INIC also assists the host for those message packets that are chosen
 for processing by host software layers. A preferred embodiment includes a trio of

pipelined processors with separate processors devoted to transmit, receive and management processing, with full duplex communication for four fast Ethernet nodes.

Isfeld discloses a communication technique for high volume connectionless-protocol, backbone communication links in distributed processing systems provides for control of latency and reliability of messages transmitted. The system provides for transmit list and receive list processes in the processors on the link. On the transmit side, a high priority command list and a normal priority command list are provided. In the message passing process, the command transmit function transmits commands across the backplane according to a queue priority rule that allows for control of transmit latency. The receiving processor processes the messages in the receive queues according to a priority rule that allows for control of the latency between receipt of a message, and actual processing of the message by the receiving processor.

The combination of Boucher and Isfeld fails to teach or suggest the elements recited in claim 1. For example neither Boucher nor Isfeld, alone or in combination, teach or describe the step of "adding an appropriate header to the slice of data being sent by placing the header in the common data buffer immediately preceding the location within the common data buffer pointed to by the start pointer and adjusting the start pointer to point to a memory location within the common data buffer of a first byte of the header added to the data contained in the common data buffer," as recited in claim 1.

The Examiner has referred to Boucher (column 2, lines 39-54) as teaching the above step of "adding" as recited in step 1. However, while Boucher describes attaching an application header to the payload data and a presentation header to the combined data, Boucher clearly fails to describe where the headers and data are specifically stored.

Boucher does not teach or suggest that the header is placed "in the common data buffer" as recited in claim 1. Boucher does not teach or suggest that the header is placed "immediately preceding the location within the common data buffer pointed to by the start pointer" as recited in claim 1. For these reasons alone, Boucher clearly cannot be combined with Isfeld to teach the above step of "adding" as recited in claim 1.

The Examiner has referred to Isfeld (column 8, lines 37-65, and column 12, lines 26-39) as teaching the above step of "adjusting the start pointer" as recited in claim 1. However, column 8, lines 37-65, does not teach or suggest the above step of "adjusting the start pointer" as recited in claim 1. Here, Isfeld merely describes passing a message and does not go down to the level of describing pointers. Column 12, lines 26-39, does not teach or suggest the above step of "adjusting the start pointer" as recited in claim 1. Isfeld merely describes that transmit buffers are pointed to by pointers. Clearly, there is no mention of pointers that are adjusted. Isfeld also does not mention a rest of the "adjusting step" including a "memory location within the common data buffer of a first byte of the header added to the data contained in the common data buffer," as recited in claim 1. For these reasons, Boucher clearly cannot be combined with Isfeld to teach the above step of "adjusting the start pointer" as recited in claim 1.

Furthermore, it is only in hindsight after reading the present invention that one might be motivated to combine Boucher and Isfeld. Even after such hindsight, Boucher and Isfeld still cannot be combined to teach or suggest the cooperation of elements as recited in claim 1.

Independent claims 2, 6, 10, 11, 15, 19, 20, 24, and 28 are system and computer readable medium, similar in scope to claim 1. Thus, the above-articulated arguments

related to claim 1 apply with equal force to claims 2, 6, 10, 11, 15, 19, 20, 24, and 28.

Accordingly, claims 2, 6, 10, 11, 15, 19, 20, 24, and 28 are also allowable over the cited reference.

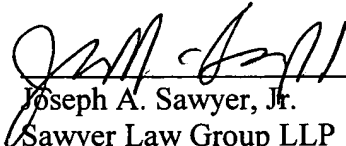
Claims 3-5, 7-9, 12-14, 16-18, 21-23, 25-27 respectively dependent from claims 1, 2, 6, 10, 11, 15, 19, 20, 24, and 28 and are thus allowable for at least the same reasons as claims 1, 2, 6, 10, 11, 15, 19, 20, 24, and 28.

Applicant believes that this application is in condition for allowance.

Accordingly, Applicant respectfully requests reconsideration and allowance of the claims as now presented.

Should any unresolved issue remain, the Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,


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